Before the
Federal Communications Commission
Washington DC 20554

In the Matter of	)	
	)	
Revision of Part 15 of the Commission's Rules	)	ET Docket 98-153
Regarding Ultra-Wideband Transmission	)	
Systems	)	

PETITION FOR PARTIAL RECONSIDERATION
OF THE
GROUND PENETRATING RADAR INDUSTRY COALITION

Mitchell Lazarus
FLETCHER, HEALD & HILDRETH, P.L.C.
1300 North 17th Street, 11th Floor
Arlington, VA 22209
703-812-0440
Counsel for the Ground Penetrating
Radar Industry Coalition

June 17, 2002

TABLE OF CONTENTS

Before the
Federal Communications Commission
Washington DC 20554

In the Matter of	)	
	)	
Revision of Part 15 of the Commission's Rules	)	ET Docket 98-153
Regarding Ultra-Wideband Transmission	)	
Systems	)	

PETITION FOR PARTIAL RECONSIDERATION
OF THE
GROUND PENETRATING RADAR INDUSTRY COALITION

Pursuant to Section 1.429 of the Commission's Rules, the Ground Penetrating Radar Industry Coalition (GPRIC) hereby files this Petition for Partial Reconsideration in the above-captioned docket, seeking relief from the First Report and Order.[1]

The GPRIC consists of Geophysical Survey Systems, Inc., Mala Geoscience, Inc., and Sensors & Software, Inc. These companies account for 95 percent of the ground penetrating radar units sold in the United States.

A. Summary

Ground penetrating radars (GPRs) are less likely to cause interference than any other type of ultra-wideband (UWB) device. Most energy from a GPR is emitted directly into the soil. Moreover, there are few GPRs in use; each operates only a small percentage of the time; and many types of applications occur primarily in lightly populated areas. Even the most zealous UWB opponents have conceded GPRs do not interfere. And yet, with no supporting evidence whatsoever in the record, the Commission has imposed more stringent rules on GPRs than on most other UWBs. Not only are these rules wholly unnecessary, but they would cripple the

---

[1] *Ultra-Wideband Transmission Systems*, ET Docket No. 98-153, First Report and Order, FCC 02-48 (released April 22, 2002).

industry so badly as to threaten the great public interest in GPR operation, including many safety applications.

The most burdensome rules were adopted unlawfully, and cannot be allowed to stand. These include limits on the categories of persons authorized to operate GPRs, and the requirement for coordination with NTIA prior to any GPR operation. The public did not have any notice of either rule, as required by the Administrative Procedure Act. Notice here was not merely inadequate -- it was nonexistent. And the adoption of these rules without any support in the record constitutes a separate APA violation. Even if these provisions were adopted at NTIA's request, that does not cure the deficiencies. The Commission's only justifiable course is to rescind both rules immediately, pending proper notice and comment.

The tight emissions limits imposed on GPRs are likewise unlawful, as they lack any support in the record. The Notice proposed the Part 15 general limits for GPRs, and the record contains no evidence supporting lower numbers. Yet the adopted rules range down to 24 dB below the general limits, and another 10 dB below that for narrowband emissions in the GPS bands. There is simply no technical justification for hobbling the GPR industry with impracticably low emissions levels.

The rules also require all of a GPR's "UWB bandwidth" -- *i.e.*, the frequency band between the points 10 dB below the highest radiated emission -- to lie below 960 MHz. While undoubtedly adopted to protect certain sensitive bands above 960 MHz, this rule backfires. As we show below, the rule disqualifies some devices whose emissions are tens of dB below the general limits at all frequencies, while passing other devices that emit far more energy. Most alarming, a low-emissions device that fails the test can be made to pass by adding noise to its

emissions. The Commission can best fix this anomaly, without increasing the interference risk, simply by eliminating the requirement to keep the UWB bandwidth below 960 MHz.

Finally, we request clarification of a technical issue.

IMPORTANT: Motion for Interim Stay of Enforcement. We show here that the Commission adopted certain rule provisions in contravention of the Administrative Procedure Act. See Part C, below. **Because these provisions were adopted unlawfully, fundamental fairness requires the Commission to announce it will stay enforcement of these provisions and permit GPR manufacture and operation at the Part 15 general limits pending reconsideration.** We have filed a Motion for Interim Stay of Enforcement simultaneously with this Petition.

B. GPR Operation Is in the Public Interest.

1. GPRs fill important societal needs.

GPR equipment takes readings downward into earth, fresh water, ice, and man-made materials to detect objects and anomalies non-destructively. These applications provide safety-of-life and other important benefits in the public interest.

Everyday GPR applications include:

- highway inspection to identify voids, pipes, and pavement thickness (essential for safety);
- bridge deck inspection for quality assurance condition assessment and maintenance decisions;
- airport runway inspection to find voids and evaluate pavement thickness -- used by NASA and all major airports (essential for safety);
- railroad bed inspection to find leaking pipes and voids (essential for safety);

- testing the soundness of subsurface environment before excavation (essential for safety);
- detection and 3-D mapping of pipes and utilities before excavation (essential for safety);
- geophysical surveys (locate bedrock, water table, and other geological properties; detect voids and anomalies);
- forensics (locating criminal evidence);
- environmental contamination surveys to determine location and extent of contamination, pipe leaks, waste pits, etc. (essential for safety);
- archaeology -- mapping of underground sites prior to digging;
- mining -- location of mineral deposits, seams, and water levels (essential for safety);
- measurement of ice thickness in rivers and lakes (essential for safety);
- under-ice Arctic and Antarctic research.

Once-in-a-lifetime GPR applications are no less important:

- discovery of the wooly mammoth in Siberia (Discovery Channel);
- survey of unopened royal tomb in Xian, China;
- discovery of unknown village near Macchu Pichu (National Geographic expedition);
- surveys at Washington's Mount Vernon, Jefferson's Monticello, and FDR's home;
- discovery of buried murder victims (some leading to convictions);
- discovery of the emerald deposit in North Carolina, North America's largest;
- location of the "Lost Squadron" in Greenland in 1992 (leading to the upcoming flight of the recovered P-38 aircraft, "Glacier Girl");

- GPR system for Mars exploration, to define creek beds where remnants of life might be found.

Some of these applications cannot be practically accomplished by any other means. For example, the use of metal detectors to locate underground pipes before excavation still leaves the risk of cutting through non-metallic facilities such as concrete pipes, fiber optic cabling, plastic gas lines, and PVC water mains. Severing any of these puts an entire community at risk; and GPR is the only reliable way to detect them. Moreover, GPRs can examine a highway roadbed in motion at 50 mph, where other methods require closing lanes to traffic, which creates congestion and safety hazards. Other applications, including some scientific research, could not be undertaken at all without GPRs.

GPR devices have a long and successful history of applications relating to research, law enforcement, infrastructure maintenance, and public safety.[2]

2. GPRs do not interfere with other spectrum users.

The Commission's UWB proceeding was unusually contentious, with over 920 docketed filings on the date the Commission adopted rules. A large majority of the submissions are passionately one-sided, arguing in the strongest terms that UWB devices either do or do not threaten harmful interference to critical applications.

Yet nearly all parties on both sides agreed on one point: GPRs do not cause interference. Some of UWB's most implacable opponents -- Air Transport Association, PCS interests, the amateur radio community, and the DARS industry -- expressly conceded they are not concerned

---

[2] *See also* Testimony of Dennis J. Johnson, President, Geophysical Survey Systems, Inc., before the United States House of Representatives, Energy and Commerce Subcommittee on Telecommunications and the Internet (June 5, 2002).

about interference from GPRs.[3] The much-cited NTIA study of UWB interference into federal systems ignored GPRs,[4] while a companion study concluded GPRs are deployed too thinly to

---

[3] Air Transport Association said:

> Precautions such as limiting UWB operations in the restricted bands to . . . UWB devices such as Ground Penetration Radar Systems ("GPRS") that direct most of their energy to the ground ultimately may serve to minimize the impact of any harmful interference by UWB operations on GPS and other safety-of-life operations.

Comments of Aeronautical Radio, Inc. and the Air Transport Association of America, Inc. at (filed Sept. 12, 2000). Sprint PCS likewise accepts GPRs:

> [S]o long as these [penetrating radar] are niche applications that are not mass marketed, Sprint does not necessarily oppose these applications.

Sprint PCS Supplemental Comments at 2 n. 3 (filed Oct. 6, 2000). The amateur radio community agrees:

> ARRL does not object to permitting GPRs to be operated anywhere in the spectrum, as proposed at paragraph 25 of the Notice, subject to appropriate emission limits. Those devices are obviously going to be deployed in limited numbers for limited times, and the majority of the RF energy is aimed into the ground.

Comments of ARRL, the National Association for Amateur Radio at 16 (filed Sept. 12, 2000). *See also* Reply Comments of XM Radio Inc. at 6 n. 8 (filed Oct. 27, 2000) (GPRs "are unlikely to pose a significant threat of interference to DARS reception.") Although some later filings requested more stringent regulatory regimes for GPRs, none provided *any* evidence that such rules are needed to prevent interference. *E.g.*, Sirius Satellite Radio et al. (filed Nov. 16, 2001).

[4] *Assessment of Compatibility Between Ultrawideband Devices and Selected Federal Systems*, NTIA Special Publication 01-43 (January 2001). This study concerned only UWB devices at elevations of 2 or 30 meters, and did not consider any devices in contact with the ground. The sole exception was a finding that GPRs would *not* interfere with the SARSAT Search and Rescue Satellite. *Id.* at 6-4.

cause interference into GPS.[5] A late-filed summary of the NTIA interference studies did not even mention GPRs.[6]

Several factors intrinsic to their operation render GPRs harmless:

- GPR energy is not directed into the air, but downward into the soil, where it dissipates harmlessly as infinitesimal amounts of heat.
- There are few GPR in use -- typically just a small number per county.
- Most GPRs are operated on a low duty cycle -- *i.e.*, even in use, they actually operate only a small percentage of the time.
- The few GPRs that operate continuously for short periods do so while in motion at high speed -- *e.g.*, inspecting highways -- and so are not an interference threat.
- Many (not all) GPR applications occur in lightly populated areas.
- Systems made by GPRIC members have a pulse repetition frequency (PRF) of 500 kHz or less. Even NTIA's testing under artificial, very-worst-case conditions has shown no interference from low-PRF GPRs.[7]

GPR manufacturers deliberately suppress airborne emissions -- not just to limit interference, but because any emissions not coupled into the ground tend to impair performance. Reflections from objects above the ground surface cause "clutter" which can mask needed subsurface signals. The quest for a better GPR thus favors minimizing emissions above the surface, with the beneficial side effect of eliminating any realistic likelihood of interference.

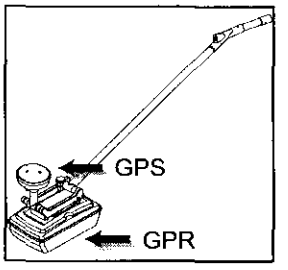
---

[5] *Assessment of Compatibility Between Ultrawideband (UWB) Systems and Global Positioning System (GPS) Receivers*, NTIA Special Publication 01-45 at xiv, 4-4, 4-21 (February 2001).

[6] Letter from William T. Hatch, NTIA, to Edmond J. Thomas, FCC (filed Feb. 22, 2002).

[7] *Assessment of Compatibility Between Ultrawideband (UWB) Systems and Global Positioning System (GPS) Receivers*, NTIA Special Publication 01-45 at xiv, 4-4, 4-12, 4-27 (February 2001).

GPRs are harmless to GPS. Concerns about interference into GPS played a large part in this proceeding. But long experience shows that GPRs have no effect on GPS operation. *Many GPR systems routinely operate with a GPS receiver fixed directly to the unit.* (See Figure 1.) Nearly all GPR systems have both hardware and software specifically designed to accommodate GPS, which is needed for mapping locations of the GPR readings. The GPS invariably functions perfectly, just centimeters from the GPR transmit antenna. Claims that GPRs could interfere with GPS receivers tens or hundreds of meters way are simply not credible.



GPR with Mounted GPS
Figure 1

The voluminous record in this proceeding contains no evidence whatsoever that GPRs cause interference to any user of the spectrum.

C. The Provisions Limiting Who May Operate GPRs, and Requiring Prior Coordination of GPR Operation, Were Adopted Unlawfully and Must Be Immediately Rescinded.

The Commission's UWB rules limit the operation of GPRs to law enforcement, fire and emergency rescue organizations, scientific research institutes, commercial mining companies, and construction companies ("operating restrictions").[8] The rules also require prior coordination of GPR operation with NTIA ("coordination requirement").[9]

These two rules must be rescinded. First -- and legally conclusive -- they were adopted unlawfully, as they were never proposed for public comment as required by the Administrative Procedure Act. Second, and equally conclusive, they are unlawful in being counter to all of the

---

[8] 47 C.F.R. Sec. 15.509(b)(1).

[9] 47 C.F.R. Sec. 15.525.

evidence in the record. NTIA's involvement in their adoption cannot compensate for these defects.

If left in place, these provisions would cripple the GPR industry and negate much of the public interest in GPR operations.

1. The operating restrictions and coordination requirement are unlawful because they were never proposed as required by the APA.

The Administrative Procedure Act (APA) provides:

> (b) General notice of proposed rule making shall be published in the Federal Register, unless persons subject thereto are named and either personally served or otherwise have actual notice thereof in accordance with law. The notice shall include --
>
> [* * *]
>
> (3) *either the terms or substance of the proposed rule or a description of the subjects and issues involved.*
>
> (c) After notice required by this section, *the agency shall give interested persons an opportunity to participate* in the rule making through submission of written data, views, or arguments . . . .[10]

Notice of neither the operating restrictions nor the coordination requirement was published in compliance with these requirements.[11] And there was no opportunity for public comment on either provision. This is *not* a question of "sufficient notice," or of "logical outgrowth" from a different notice. This was no notice at all.

---

[10] 5 U.S.C. Sec. 553 (emphasis added).

[11] *See Ultra-Wideband Transmission Systems*, 15 FCC Rcd 12086 (2000) (Notice of Proposed Rule Making) (Notice). The only mention of coordination in the Notice is the recitation of a *party's* (not the Commission's) suggestion for coordination solely of *over-powered* UWB devices. *Id* at para. 17. This comes nowhere near constituting notice as required by the APA. There was no mention of the operating restrictions.

U.S. Court of Appeals precedent on the APA notice provisions is clear, consistent, and unambiguous:

> Notice of a proposed rule must include sufficient detail on its content and basis in law to allow for meaningful and informed comment.[12]

The D.C. Circuit had earlier explained:

> The purpose of the comment period is to allow interested members of the public to communicate information, concerns, and criticisms to the agency during the rule-making process. *If the notice of proposed rule-making fails to provide an accurate picture of the reasoning that has led the agency to the proposed rule, interested parties will not be able to comment meaningfully upon the agency's proposals.* As a result, the agency may operate with a one-sided or mistaken picture of the issues at stake in a rule-making.[13]

There are only two exceptions to the notice-and-comment requirement, neither of which conceivably applies here. The statute provides:

> Except when notice or hearing is required by statute, this subsection [on notice and comment] does not apply --
>
> (A) to interpretative rules, general statements of policy, or rules of agency organization, procedure, or practice; or
>
> (B) when the agency for good cause finds *(and incorporates the finding and a brief statement of reasons therefor in the rules issued)* that notice and public procedure thereon are impracticable, unnecessary, or contrary to the public interest.[14]

---

[12] *American Medical Ass'n v. Reno*, 57 F.3d 1129, 1132 (D.C. Cir. 1995) (remanding for adequate notice and comment).

[13] *Connecticut Light and Power Co. v. Nuclear Regulatory Comm'n*, 673 F.2d 525, 530 (D.C. Cir. 1982) (emphasis added), *cert. denied,* 459 U.S. 835 (1982). *See Home Box Office, Inc. v. FCC*, 567 F.2d 9, 55 (D.C. Cir. 1977) (notice must provide sufficient information to permit "adversarial critique"), *cert. denied,* 434 U.S. 829 (1977).

[14] 5 U.S.C. Sec. 553(b)(3) (emphasis added). Separately excluded from all rulemaking requirements are "(1) a military or foreign affairs function of the United States; or (2)

Paragraph (A) is inapplicable on its face. And paragraph (B) places a procedural obligation on the Commission (in the italicized language) that the Commission has not complied with. Moreover, the D.C. Circuit construes paragraph (B) as limited to "emergency situations."[15] The Commission has not (and could not) claim an emergency here.

Under the precedents that bind the Commission, the operating restrictions and coordination requirement simply cannot stand. The Commission must rescind them.

2. *In addition, the operating restrictions and coordination requirement are unlawful because they have absolutely no support in the record.*

The requirement for notice and comment promotes an informed decision by establishing a mechanism for interested parties to offer the agency relevant information. That statutory purpose would fail, however, if the agency were free to ignore the information submitted.[16] For that reason the courts have consistently required the agency decision to be consistent with the record. The U.S. Supreme Court held:

> [A]n agency rule would be arbitrary and capricious if the agency . . . *offered an explanation for its decision that runs counter to the evidence before the agency,* or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.[17]

---

a matter relating to agency management or personnel or to public property, loans, grants, benefits, or contracts." 5 U.S.C. Sec. 553(a). These are plainly inapplicable.

[15] *Tennessee Gas Pipeline Co. v. FERC*, 969 F.2d 1141, 1144 (D.C. Cir. 1992).

[16] "[T]he opportunity to comment is meaningless unless the agency responds to significant points raised by the public." *ACLU v. FCC*, 823 F.2d 1554, 1581 (D.C. Cir. 1987). *See also Home Box Office v. FCC*, 567 F.2d 9, 35-36 (D.C. Cir.) (same), *cert. denied*, 434 U.S. 829 (1977).

[17] *Motor Vehicle Mfrs. Ass'n v. State Farm Mutual Auto Ins.*, 463 U.S. 29, 43 (1983) (emphasis added).

The Commission's basis for the operating restrictions and coordination requirement does not even rise to the standard that the Court found wanting. Here, the Commission provided not even an explanation running counter to the evidence, but *no explanation at all* in terms of the evidence. (And, of course, there is no evidence to support these rules.)

The D.C. Circuit similarly requires the Commission to "draw 'reasonable inferences based on substantial evidence.'"[18] Otherwise the decision cannot stand: "[W]here the record belies the agency's conclusion, [the court] must undo its action."[19] Similarly: "[W]e will not uphold an agency's action where it has failed to offer a *reasoned explanation that is supported by the record.*[20] Other circuits agree.[21]

---

[18] *Time Warner Entertainment v. FCC*, 240 F.3d 1126, 1133 (D.C. Cir.), *cert. denied*, 122 S. Ct. 644 (2001), *quoting Turner Broadcasting System v. FCC*, 512 U.S. 622, 664 (1994). *See also Century Communications v. FCC*, 835 F.2d 292, 300-302 (D.C. Cir 1987) (rejecting FCC's judgment where supported by "scant" evidence); *Bechtel v. FCC*, 957 F.2d 873, 881 (D.C. Cir. 1992) (enunciating agency's responsibility to present evidence and reasoning supporting its substantive rules).

[19] *Petroleum Communications v. FCC*, 22 F.3d 1164, 1172 (D.C. Cir. 1994).

[20] *American Tel. & Tel. v. FCC*, 974 F.2d 1351, 1354 (D.C. Cir 1992) (emphasis added). Similarly, "[A] regulation perfectly reasonable and appropriate in the face of a given problem may be highly capricious if that problem does not exist." *Turner Broadcasting System v. FCC*, 512 U.S. 622, 664 (1994), *quoting Home Box Office v. FCC*, 567 F.2d 9, 36 (D.C. Cir. 1977).

[21] *E.g., Cincinnati Bell Tel. v. FCC*, 69 F.3d 752, 760 (6th Cir. 1995) (FCC must provide at least some support for predictive conclusions); *Northwest Pipeline Corp. v. FERC*, 61 F.3d 1479, 1485-1486 (10th Cir. 1995) (agency decision may be arbitrary and capricious if there is no rational connection between the facts found and the choice made); *People of California v. FCC*, 905 F.2d 1217, 1230 (9th Cir. 1990) (agency action is in violation of APA if agency explanation runs counter to evidence); *Consumers Union of United States Inc. v. Consumer Prod. Safety Comm'n*, 491 F.2d 810, 812 (2nd Cir. 1974) (agency must not ignore evidence placed before it by interested parties).

Two rules (among others) adopted in this proceeding-- the operating restrictions and coordination requirement -- simply have no basis in the record. In consequence, they were adopted contrary to statutory mandate, and may not be allowed to stand.

3. NTIA's involvement does not abrogate the Commission's statutory obligations.

It is widely understood that the Commission included the operating restrictions and coordination requirement at the insistence of NTIA.[22] But the wishes of a sister agency cannot relieve the Commission of its statutory obligations. Until Congress says otherwise, the APA notice-and-comment requirement and the obligation to base decisions on the record remain in full force, notwithstanding NTIA's concerns.

To be sure, a Commission rule exempts NTIA from routine *ex parte* filings.[23] But the Commission cannot override a statute by rule. And the D.C. Circuit warned of the risks of withholding decision-making information:

> In order to allow for useful criticism, it is especially important for the agency to identify and make available technical studies and data that it has employed in reaching the decisions to propose particular rules. To allow an agency to play hunt the peanut with technical information, hiding or disguising the information that it employs, is to condone a practice in which the agency treats what should be a genuine interchange as mere bureaucratic sport. *An agency commits serious procedural error when it fails to reveal*

---

[22] *See* Mary Greczyn, *Commission Approves UWB Order, Agrees to Revisit Limits*, Communications Daily, Feb. 15, 12001, at 3 (standards based in large measure on NTIA beliefs concerning protection of government operations). *Cf.* First Report and Order at para. 19 (coordination requirement for imaging devices "requested" by NTIA).

[23] 47 C.F.R. Sec. 1.1204(a)(5).

portions of the technical basis for a proposed rule in time to allow for meaningful commentary.[24]

Thus, NTIA's participation -- and its late-disclosed submissions[25] -- do not excuse violations of the Administrative Procedure Act. The operating restrictions and coordination requirement must be rescinded.

4. The operating restrictions and coordination requirement are contrary to the public interest.

The operating restrictions and coordination requirement would cripple the GPR industry and eliminate much of the public interest benefit described in Part B.1 above.

Operating restrictions. The permitted categories of GPR operators -- law enforcement, fire and emergency rescue organizations, scientific research institutes, commercial mining companies, and construction companies[26] -- omit a large majority of legitimate users. Most operation in support of construction and mining, for example, is not conducted by those industries, but by independent service providers and consultants. The rule would also disqualify countless safety-critical applications such as testing the integrity of nuclear plants, and inspecting dams and airport runways for soundness. Further excluded are federal, state, and local transportation departments, and the professional firms that provide them with GPR services.[27]

---

[24] *Connecticut Light and Power Co. v. Nuclear Regulatory Comm'n*, 673 F.2d 525, 530 (D.C. Cir. 1982) (emphasis added; citation footnote omitted), *cert. denied,* 459 U.S. 835 (1982).

[25] *See* Letter from William T. Hatch, NTIA, to Edmond J. Thomas, FCC (filed Feb. 22, 2002).

[26] 47 C.F.R. Sec. 15.509(b)(1).

[27] For details, see Petition for Partial Reconsideration of the GPR Service Providers Coalition at 5-6 (filed June 17, 2002).

As noted above, there is neither a legal nor a factual basis for restricting GPR operations to particular users. At the same time, however, to eliminate even hypothetical harm in making GPRs widely available to consumers, we will not contest a rule that limits GPR operation to parties eligible for licensing under the provisions of Part 90 of the FCC's rules.

Coordination. The coordination requirement misapprehends the typical character of GPR operations. The need is often urgent -- for example, a threat to worker safety from a suspected subsurface hazard at a mine or construction site; needed assessment of an environmental contamination that threatens public health; or inspection of a highway or airport runway in response to surface anomalies indicating possible defects in the roadbed. Typically the GPR studies are completed within a few days after the need first arises. A coordination period of 15 business days[28] would effectively rule out GPR for many ordinary applications, and in some cases the delay would entail serious risks to public or worker safety. Although the Commission promises a faster turn-around for special temporary operations when circumstances warrant,[29] we agree with the GPR Service Providers Coalition that a substantial majority of requests would have to be treated as emergencies just to be processed at all in a workable time.[30]

Moreover, one informed estimate has 1000 GPR devices in service 200 days a year, with each job taking an average of two days.[31] That adds up to 100,000 coordinations per year -- a staggering burden on both the Commission and NTIA. Almost as great would be the paperwork

---

28 First Report and Order at para. 56.

29 *Id.*

30 Petition for Partial Reconsideration of the GPR Service Providers Coalition at 11.

31 *Id.*

burden on GPR users -- many of which are small businesses lacking a dedicated office staff, and not in a position to file forms with the Commission every few days.

Although the coordination requirement lacks any legal or factual justification, we acknowledge NTIA's interest in protecting certain sensitive installations. We will not object to a rule that identifies those specific installations and requires prior coordination within a reasonable radius, perhaps a kilometer.

D. The Commission Should Allow GPR Emissions at the General Limits, and Should Abolish Restrictions on Placement of the UWB Bandwidth.

1. Nothing in the record justifies restrictions more stringent than the general limits for GPRs.

The Notice proposed that GPRs be permitted to operate at the "general limits" across the spectrum.[32] But the First Report and Order subsequently imposed much more stringent rules:

below 960 MHz	general limits
960-1610 MHz	24 dB below general limits
1610-1990 MHz	12 dB below general limits
above 1990 MHz	10 dB below general limits.

In addition, spectral lines in the GPS bands are limited to 34 dB below the general limits.[33]

There is no evidence in the record -- no experiment, and no simulation -- suggesting that GPRs present any threat of interference at the general limits, as originally proposed. The only rational decision, in light of the record, is to apply the general limits, without narrowband

---

[32] Notice at para. 39. The term "general limits" here refers to the limits set out in Section 15.209(a). These are numerically identical to the "Class B" limits for unintentional radiators in Section 15.109(a). The numbers are very small -- above 960 MHz, just 75 billionths of a watt per megahertz.

[33] 47 C.F.R. Sec. 15.509(d).

notches, at all frequencies.[34] (GPR depends critically on smooth broad spectral signals; and the imposition of narrowband notching at unrealistically low emissions levels precludes operation of the device for many octaves on either side the notch.)

2. *The Commission should abolish a rule provision that favors interfering over non-interfering devices.*

The present rules include a perverse anomaly: they *disqualify* certain devices having a much lower interference potential than compliant devices. Worse, a non-compliant device can be made compliant by *increasing* its interference potential.

The Commission requires the "UWB bandwidth" of a GPR to lie completely below 960 MHz.[35] The UWB bandwidth is defined as the frequency band bounded by the "10 dB points" -- *i.e.*, the points that are 10 dB below the highest radiated emission.[36] In other words, both 10 dB points must lie below 960 MHz.

Consider two plots of emissions against frequency. One plot is low and shallow:

	Frequency	Emissions (in dB below general limits)
lower 10 dB point	500 MHz	-50 dB
center frequency	1000 MHz	-40 dB
upper 10 dB point	1500 MHz	-50 dB

(See the left-hand figure below, lower plot.) Despite almost unmeasurably low emissions, this device *violates* the rules, because the upper 10 dB point is above 960 MHz. Compare it to a second device whose plot is centered lower in frequency, but is much higher and steeper:

---

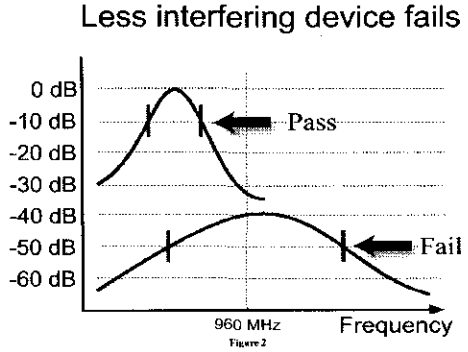
[34] *See* Part C.2 above for references to the case law establishing that the Commission cannot establish rules that run counter to the record.

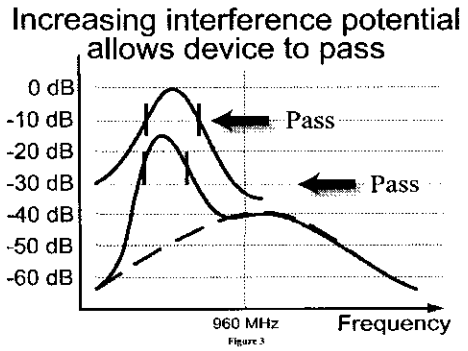
[35] 47 C.F.R. Secs. 15.509(a).

[36] 47 C.F.R. Sec. 15.503(a).

	Frequency	Emissions (in dB below general limits)
lower 10 dB point	500 MHz	-10 dB
center frequency	700 MHz	0 dB
upper 10 dB point	900 MHz	-10 dB

(Left-hand figure, upper plot) This second device emits far more energy, yet succeeds in placing both 10 dB points below 960 MHz. As a result, it *passes* -- even though the higher energy is more likely to cause interference.





Worst of all, the lower-emitting device can be made to pass simply by *adding* at least 10 dB of signal (or noise!) anywhere below 960 MHz. (See the right-hand figure above.) The 10 dB points would then be defined relative to the new maximum. The same emissions above 960 MHz -- which previously disqualified the device -- now become acceptable out-of-band emissions. This scenario is extremely disquieting: a non-compliant device made compliant by increasing its interference potential!

We understand the rule keeping the 10 dB points below 960 MHz was imposed at the request of NTIA, in response to concerns about the "restricted bands."[37] Certain restricted bands of interest to NTIA, including GPS, lie above 960 MHz. Ordinarily the Commission permits

---

[37] The restricted bands are listed in Section 15.205(a).

only spurious emissions into the restricted bands. This is straightforward with respect to a conventional narrowband transmitter, whose spurious emissions are simply those outside the occupied bandwidth. But a UWB emitter has no well-defined "spurious emissions," in the sense that a narrowband transmitter does. At NTIA's request, the Commission appears to have adopted an *ad hoc* variation on the restricted-band rule by permitting only emissions outside the UWB bandwidth above 960 MHz. While this rule arguably maintains the doctrinal status of the restricted bands, it produces the unfortunate result of disqualifying some very safe devices, and approving some having far more potential to interfere.

The Commission should simply eliminate the requirement that the UWB bandwidth lie below 960 MHz, and rely on reasonable emissions limits to prevent interference.

E. Other Matters

The following technical matter urgently needs correction.

Peak measurement procedures below 1 GHz. UWB manufacturers are required to report average emissions above 1 GHz, and quasi-peak measurements below 1 GHz.[38] Section 15.509(f) also limits peak measurements across a 50 MHz bandwidth.[39] The limit in peak emissions is needed above 1 GHz because the average emissions do not fully reflect the interference potential.[40] Below 1 GHz, however, the Commission concluded that quasi-peak emissions will closely approximate levels.[41]

---

[38] 47 C.F.R. Secs. 15.35(a) (quasi-peak); 15.35(b) (average).

[39] 47 C.F.R. Sec. 15.509(f).

[40] See First Report and Order at para. 208; Notice at para. 36.

[41] First Report and Order at para 215 n. 324.

Both the Notice and common sense suggest the Commission intended to regulate both the peak and average emission levels above 1 GHz, but only quasi-peak emission levels below 1 GHz.[42] Inadvertently, perhaps, Section 15.509(f) requires peak measurements across the entire spectrum, not just above 1 GHz. We ask the Commission to correct this error by limiting the requirement for peak measurements to frequencies above 1 GHz.

CONCLUSION

This proceeding has been a continuing test of patience, stamina, and goodwill for the Commission and the parties alike. We acknowledge the unusually strong pressures on the Commission, especially through the final weeks of the proceeding. We commend the Commission for issuing a comprehensive and thorough First Report and Order on an expeditious schedule, in the face of conflicting demands.

A few of the last-minute compromises, however, do not measure up to the statutory requirements. We urgently ask the Commission to rescind the rules it adopted unlawfully, and to

---

[42] "We tentatively conclude that it is necessary to regulate both the peak and average emission levels above 1 GHz and the quasi-peak emission levels below 1 GHz from UWB transmitters . . . ." Notice at para. 36.

bring others into conformity with the record. In a separate motion, we further ask the Commission to respect fundamental fairness by announcing it will stay enforcement of the challenged provisions and permit GPR manufacture and operation at the Part 15 general limits pending this reconsideration.

Respectfully submitted,

Mitchell Lazarus
FLETCHER, HEALD & HILDRETH, P.L.C.
1300 North 17th Street, 11th Floor
Arlington, VA 22209
703-812-0440
Counsel for the Ground Penetrating
Radar Industry Coalition

June 17, 2002

SERVICE LIST

Chairman Michael K. Powell
Commission Kathleen Q. Abernathy
Commissioner Michael J. Copps
Commissioner Kevin J. Martin
Ed Thomas, OET
Julius P. Knapp, OET
Bruce A. Franca, OET
Bruce A. Romano, OET
Michael J. Marcus, OET
Alan Stillwell, OET
Lauren Van Wazer, OET
Karen Rackley, OET
Alan J. Scrime, OET
Geraldine Matise, OET
John A. Reed, OET
Ron Chase, OET
Lisa Gaisford, OET
Michael D. Gallagher, NTIA